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(FILE 'USPAT' ENTERED AT 13:45:51 ON 16 JUL 92)

SET PAGELENGTH 19

SET LINELENGTH 78

L1 4462 S CONDUCT?(3A) POLYMER#.

L2 460 S CONDUCT?(P) (POLYANILINE# OR POLYTHIOPHENE# OR POLYPYRROLE#)

L3 4539 S L1 OR L2

L4 142 S (POLYANILINE# OR POLYTHIOPHENE# OR POLYPYRROLE#) AND 252/50  
SET HEAD OFF

L5 4548 S L4 OR L3

L6 12717 S (POLYACRYLIC OR POLYSULFONIC OR (CELLULOSE(W)SULFONIC) OR P

L7 17460 S L6 OR POLYPHOSPHORIC

L8 98 S L7(P) (DOPANT# OR DOPING OR DOPE# OR POLYDOPANT#)

L9 15 S L8 AND L5

=> d 19 1 cit,detd(2)

5,099,621, Mar. 31, 1992, Thermal window glazing with ~~conductive~~

~~Polymer~~ coating to block radiative heating; Lawrence W. Schacklette, et al., 52/171, 304, 788 [IMAGE AVAILABLE]

US PAT NO: 5,099,621 [IMAGE AVAILABLE]

L9: 1 of 15

DETDESC:

DETD(2)

Referring specifically to the drawings, in FIG. 1, there is shown a single pane, 2, having applied thereto a ~~conducting Polymer~~ layer, 1, that is also supported on a plastic sheet, 3, which both supports the ~~conductive Polymer~~ layer before application and provides protection in the final embodiment from air, water and abrasion.

=> d 19 2 cit,detd(43)

2. 5,068,060, Nov. 26, 1991, Neutral and electrically conductive

~~Poly(heterocyclic vinylenes)~~ and processes for preparing same; Kwan-Yue A. Jen, et al., 252/500, 518, 519 [IMAGE AVAILABLE]

US PAT NO: 5,068,060 [IMAGE AVAILABLE]

L9: 2 of 15

DETDESC:

DETD(43)

Still other useful electron acceptors include the aforementioned electrolyte salts, or polymers electrolytes such as polymers substituted with one or more anionic functional groups such as carboxylic acid and sulfonic acid groups, as for example polyethylene sulfonic acid, ~~Polyacrylic~~ acid, polymethacrylic acid, polystyrene sulfonic acid and co-polymers thereof which can be used to ~~dope~~ the polymer by oxidising the polymer with an oxidant such as oxygen, hydrogen peroxide, K<sub>2</sub>S<sub>2</sub>O<sub>8</sub>, NaClO<sub>3</sub>, Br<sub>2</sub>, Cl<sub>2</sub>, NaClO<sub>4</sub> and the like.

=> d 19 3 detd(17)

US PAT NO: 5,064,574 [IMAGE AVAILABLE]

L9: 3 of 15

DETDESC:

DETD(17)

Specific additives indicated in Table II were prepared as followed. The LiBF<sub>4</sub> and NaB<sub>4</sub> salts were dissolved in minimal amounts of ethanol (<5 milliliters) prior to being added to NMP solvated SIXEF-44. 6FDA-Li was prepared by adding concentrated aqueous lithium hydroxide (LiOH) solution to 6FDA in a methanol/NMP solvent blend followed by reaction at ambient temperature for sixteen hours. After concentrating the resulting adduct using a rotary evaporator, it was filtered prior to incorporation into NMP solvated SIXEF-44. 6FPA-Li was prepared from 6FPA using a similar procedure, with **Polyamic** acids being formed having 1:2 molar ratios of

US PAT NO: 5,064,574 [IMAGE AVAILABLE]

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DETD(17)

6FDAM to 6FDA. In addition to the LiOH **Dapting**, **Polyamic** acids salts (1:1 molar ratio 6FDAM to 6FDA) were formed with Hoechst Celanese-provided perfluorooctanoic acid lithium salt, (C<sub>8</sub>H<sub>14</sub>F<sub>8</sub>O<sub>2</sub>Li). The **Polyamic** acid salt was cast into a thin film and imidized, as well as being added to SIXEF-44 and cured.

=> d 19 4 clms(1)

US PAT NO: 4,986,946 [IMAGE AVAILABLE]

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CLAIMS:

CLMS(1)

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US PAT NO: 4,986,946 [IMAGE AVAILABLE]

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CLMS(1)

I claim:

1. A process for making a film having good high temperature performance and intermediate electrical conductivity comprising the steps of:
  - (a) dispersing about 10 to about 45% by weight, based on the weight of the final film, of a finely-divided electrically conductive particulate material homogeneously throughout a casting **dope**, said casting **dope** comprising a **Polyamic** acid and a solvent for the **Polyamic** acid, said solvent being present in an amount of about 75 to about 90 weight percent of the combined **Polyamic** acid and particulate material;
  - (b) casting or extruding the dispersion formed in step (a) onto a smooth surface;
  - (c) providing intimate contact of the dispersion on the smooth surface with **Polyamic** acid conversion chemicals in sufficient quantity and at a

US PAT NO: 4,986,946 [IMAGE AVAILABLE]

L9: 4 of 15

CLMS(1)

sufficient temperature to partially convert the **Polyamic** acid to polyimide, thereby forming a gel;

- (d) thereafter contacting the gel with an aqueous medium comprising a major proportion of water and a minor proportion of solvent for the **Polyamic** acid; and
- (e) maintaining the contact of step (d) for a sufficient time and with a sufficient volume of aqueous medium to reduce the amount of solvent in the gel to less than 15 parts of solvent per 100 parts of **Polyamic** acid-polyimide.

=> d 19 3,4 cit

3. 5,864,574, Nov. 12, 1991, Method and composition for providing electrostatic discharge protection for spacecraft; Susan L. Oldham, et al.,

252/518, 500; 524/80, 401, 404 [IMAGE AVAILABLE]

4. 4,986,946, Jan. 22, 1991, Polyimide articles of intermediate electrical conductivity and a process for making them; Darrell J. Parish, 264/104; 252/511, 512; 264/105, 331.11, 331.19, 347 [IMAGE AVAILABLE]

=> d 19 6 cit, detd(8)

5. 4,940,517, Jul. 10, 1990, Polymerization of aniline and its derivatives; Yen Wei, 264/78, 59R, 72; 528/422 [IMAGE AVAILABLE]

US PAT NO: 4,940,517 [IMAGE AVAILABLE]

L9: 6 of 15

DETDESC:

DETD(8)

According to another embodiment of the present invention, the acidic medium

US PAT NO: 4,940,517 [IMAGE AVAILABLE]

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DETD(8)

or electrolyte may contain a polymeric acid, such as ~~Polymer~~ or acrylic acid, in order to ~~sope~~ the polyaniline polymer to improve its mechanical properties.

=> d 19 7 cit, detd(10)

7. 4,933,106, Jun. 12, 1990, Highly ~~conductive~~ **Polymer** composition and process for producing the same; Toshiyuki Sakai, et al., 252/500; 264/59F, 59R. [IMAGE AVAILABLE]

US PAT NO: 4,933,106 [IMAGE AVAILABLE]

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DETDESC:

US PAT NO: 4,933,106 [IMAGE AVAILABLE]

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DETD(10)

Among these anionic polymer electrolytes preferred are polyphosphoric acid, fluorine-based polymers containing sulfonic acid groups or carboxylic acid groups, and polyacrylic acid. Polyphosphoric acid is particularly preferred when the ~~conductive~~ **Polymer** is polyisothianaphthene.

=> d 19 9 cit, detd(24)

9. 4,832,869, May 23, 1989, Highly ~~conducting~~ **Polymer**s and materials for polymeric batteries; David B. Cotts, 252/500, 518; 524/80, 401, 404, 408, 415, 429; 528/103, 185, 266, 337, 345, 422, 423

US PAT NO: 4,832,869

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DETDESC:

(b) In accordance with the general polymerization procedure described above, dithiamalonyldiamine is combined with oxalic acid in a 10% solution in **Polyphosphoric** acid, or with oxalyl chloride in a 10% solution in a aprotic organic solvent. After heating for 6 hours, the solution is cooled and recovered by precipitation into a 10 fold excess of water or methanol, or spun directly into fibers using wet spinning techniques. The polymer is expected to have high conductivity on **doping** using I.<sub>sub.3</sub>.sup.-.

=> d 19 10 cit, bsum(32)

10. 4,810,419, Mar. 7, 1989, Shaped electroconductive aromatic imide polymer article and process for producing; Akihiro Kunimoto, et al., 252/511, 502;  
264/29.2, 105, 331.12; 428/303, 473.5; 524/847, 879

US PAT NO: 4,810,419

L9: 10 of 15

SUMMARY:

BSUM(32)

Optionally, an additional amount of the polymerization medium or an additive is added to the polymerization admixture to control the rotation viscosity of the polymerization admixture to a desired level, or the polymerization admixture is defoamed. The resultant **copolymer** consists of a solution of the resultant polymerization product consisting of an aromatic **Polyamide** acid, an aromatic imide polymer or a mixture thereof, and the carbon fibers evenly dispersed in the solution.

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